ENVIRONMENTAL ASSESSMENT

Evaluation of Livestock Grazing and Habitat Assessment
of Bog Turtle (*Clemmys muhlenbergii*) Areas in the Plateau and Highlands District
along the Blue Ridge Parkway

United States Department of the Interior * National Park Service

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February 9, 2001

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PURPOSE AND NEED

BACKGROUND

Biological Status: The bog turtle (*Clemmys muhlenbergii*) is considered to be the rarest freshwater turtle in North America (Mitchell 1994). Though the bog turtle occupies a range from Massachusetts to northern Georgia, the bog turtle's distribution within this range is spotty and disjunct. A 250-mile gap located between central Maryland and southwestern Virginia separates the species into a northern and southern population (Herman 1994; U.S. Fish and Wildlife Service (USFWS) 1997). In Virginia, the bog turtle is found only in the counties of Floyd, Patrick, Carroll and Grayson (Mitchell 1994); in North Carolina, the counties of Ashe, Alleghany and Watauga and several others south of Asheville. Ironically, much of the bog turtle's range in Virginia and northern North Carolina is scattered along a narrow belt located in and along the Blue Ridge Parkway (Davis 1995).

Bog turtle populations are believed to be declining throughout their range (Carter 1997; USFWS 1997). This population decline is believed to be the result of illegal collection for the pet trade, and loss of habitat through ditching, draining and filling in of wetlands for development and agriculture (Mitchell 1994). However, other factors including the species' low reproductive rates, isolation of individual populations, predation, flooding of habitat by beaver, mortality due to vehicles, livestock grazing, and pollution may also be contributing to the bog turtle's decline (USFWS 1997).

Although the southern bog turtle's Threatened status under the Endangered Species Act (ESA) affords it some protection from illegal collecting, this protection does not extend to its habitat. Land alteration activities, such as water diversion, mowing, grazing and the legal application of pesticides and herbicides, are still permitted to occur within bog turtle habitat in the species southern range.

Parkway Issues and Concerns: Wetlands along the Blue Ridge Parkway are important to protection of bog turtles--offering one of the last refuges where both the bog turtle and its habitat are protected. Wetlands along the Blue Ridge Parkway, however, are not pristine and many have been impacted by past agricultural activities and development. Many of the wetlands along the Parkway are grazed as part of the Park's agricultural lease program.

The Agricultural Lease Program on the Blue Ridge Parkway was started by early Landscape Architects in order to preserve the rural character of the Blue Ridge Parkway. Scenic views of highland farms, weathered cabins, garden plots and old barns were deemed to be as important to the visitor experience as were scenic overlooks and vistas. The Parkway maintains more than 400 agricultural leases,

comprising approximately 4,000 acres, and including livestock pastures, hay fields, and row crops. In many cases, cattle grazing occur within wetlands occupied by the bog turtle. Livestock have been removed from several Parkway wetlands due to overgrazing. Many of these areas are now growing up rapidly with woody vegetation through natural succession.

Grazing has been used in North Carolina as an important management tool in maintaining wet meadows and bog turtle habitat (Herman 1994). Small numbers of cattle or horses have been used to keep wetlands open by preventing/controlling establishment of woody vegetation. Also, Carter (1997) has found bog turtles foraging for invertebrates in cattle hoof prints, which frequently retain shallow pools of water. However, too many cattle may impact the bog turtles habitat by compacting the soil, disrupting the natural hydrological sheet flow, and by overbrowsing native wetland plant species (Carter 1997; Herman 1994). Turtles bearing injuries from having been trampled by cattle have also been observed within several grazed areas (Davis, personal observation). Though Carter (1997) did not examine the impacts of grazing specifically, some of his data did suggest that ungrazed areas had deeper mud and water than grazed areas. Replication of different grazing intensities and comparisons of grazed and ungrazed are strongly needed to rigorously examine the impacts of grazing.

Bog Turtle Management on the Parkway: The primary objective of bog turtle management along the Blue Ridge Parkway is to protect and maintain bog turtle populations and habitat along the Parkway in concert with cooperating agencies and adjacent neighbors. The Parkway recognizes that in many cases wetlands comprising bog turtle habitat do not occur solely within the boundaries of the Parkway. Many of these areas occur jointly on BLRI lands and privately owned lands. Thus a cooperative approach with adjacent landowners and agencies is necessary to manage/protect these wetlands.

A long-range goal of the Parkway is to develop a conservation and management plan in cooperation with the VDGIF and the NCWRC and others for the bog turtle and its wetland habitats along the Parkway. Information needed to develop this long-term management plan include: (1) assessing the impacts of cattle grazing on bog turtle habitats, (2) understanding the landscape-level context in which the bog turtle occurs, (3) examining the impacts of natural succession on bog turtle populations and determining which management strategies (e.g. select cutting, controlled burning, grazing) or combinations are most effective; and (4) establishing long-term monitoring protocol for existing bog turtle areas.

Goals of the Proposed Project: The overall goal of the proposed grazing study is to evaluate the impacts of cattle grazing on the bog turtle and its wetland habitats along the Blue Ridge Parkway. Specifically this study will evaluate which cattle densities and rotations best to maintain bog turtle habitat and how vegetation and habitat features (e.g. mud and water depth) within these wetlands change when cattle are excluded from an area.

This study appears to meet the goals and objectives of the U.S. Fish and Wildlife Service's Bog Turtle (*Clemmys muhlenbergii*) -- Northern Population Recovery Plan. Specifically, the study is in keeping with the following Recovery Tasks identified for the Northern Population:

- 6.3.1: Identify the safest most effective methods for controlling invasive native and exotic plants, and setting back succession; and

- 6.3.2: Determine the safest and most effective methods for using grazing to restore and maintain bog turtle habitat.

Task No. 6.3.2. states that: "Studies regarding the effects of grazing on bog turtles and their habitat should especially be conducted in the species' southern range due to the prevalence of grazing at numerous bog turtle sites in the south."

This study also supports the Parkway's Draft Agricultural Lease Management Plan, which lists as a primary objective the need to evaluate the impacts of grazing and other agricultural activities on natural resources including wetlands and threatened and endangered plants and animals.

PURPOSE AND NEED FOR ASSESSMENT

The purpose of this document is to evaluate the direct, secondary, and cumulative environmental consequences of carrying out a cattle exclosure study to evaluate the impacts of grazing pressure on the bog turtle and on its wetland habitats along the Blue Ridge Parkway, National Park Service, United States Department of the Interior lands.

National Park Service (NPS) guidelines for compliance with the National Historic Preservation Act (NHPA) and National Environmental Policy Act (NEPA) require an analysis of potential impacts on the proposed activities on natural and historic resources and the human environment.

ALTERNATIVES, INCLUDING THE ENVIRONMENTALLY PREFERABLE ALTERNATIVE

This section describes the alternatives that are analyzed in this environmental assessment. The alternatives are no action, (1) manipulating grazing intensities, (2) comparison of grazed and ungrazed within each study area, and (3) the environmentally preferable alternative: combination of manipulating grazing intensities and comparison of grazed and ungrazed areas.

NO ACTION ALTERNATIVE

Under the No Action Alternative, the proposed study to evaluate the impacts of cattle grazing on the bog turtle and its habitat would not be carried out. Cattle grazing, which already occurs in approximately 15 bog turtle areas along the Parkway, would likely continue at its current level.

ALTERNATIVE 1 – MANIPULATE GRAZING INTENSITIES

Alternative 1 would involve randomly allocating different grazing intensities (low, moderate and heavy) in 10 different areas containing known or suspected bog turtle populations in order to do a controlled comparison of different grazing intensities. Grazing intensities in 5 of the study areas would be 2 animal units per acre heavy intensity in order to achieve the desired level of grazing for the purposes of the study. Five areas would be used as control, where intensity is not increased. Small temporary exclosures ranging in size from 10 m x 10m (30 ft x 30 ft.) in smaller areas to 30 x 30 m (100 ft. x 100 ft) in larger areas would be constructed in each of the 10 study areas along the Parkway. Exclosures would be constructed using locust or metal fence posts and 3-4 strands of 12-gauge barbwire. Exclosures would allow us to measure changes in habitat quality at different levels of grazing. At two study areas, bog turtles would be live captured and fitted with radio transmitters in order to assess whether turtles use grazed areas differently from ungrazed areas.

ALTERNATIVE 2 – COMPARISON OF GRAZED AND UNGRAZED WITHIN EACH STUDY AREA

Under Alternative 2, existing livestock pastures containing known or suspected bog turtle populations would be assessed to determine their current level of grazing (light, moderate or heavy). Small temporary exclosures ranging in size from 10 m x 10m in smaller areas to 30 x 30 m in larger areas would be constructed in 10 areas along the Parkway using locust or metal fence posts and 12-gauge barbwire. At two areas bog turtles would be live captured and fitted with radio transmitters in order to assess whether turtles use grazed areas differently from ungrazed areas. Existing grazing intensities within the study areas would not be increased above current levels.

ALTERNATIVE 3 – THE ENVIRONMENTALLY PREFERABLE ALTERNATIVE - COMBINATION OF MANIPULATING GRAZING INTENSITIES AND COMPARISON OF GRAZED AND UNGRAZED AREAS

The primary objective of this alternative is to assess the impacts of livestock grazing on bog turtle populations at 10 areas along the Blue Ridge Parkway in Floyd, Patrick, Carroll and Grayson Counties, Virginia and Allegheny, Ashe, Wilkes and Watauga Counties, North Carolina (exact locations and descriptions of the proposed study areas are not provided because of the rarity of the bog turtles); to monitor bog turtle responses (using radio telemetry) to various levels of grazing; to collect baseline habitat measurements at known Parkway bog turtle areas; and to provide recommendations for management of bog turtle habitat along the Parkway.

Study areas will be assessed to determine the current grazing intensity (number head per acre) and current habitat conditions (vegetative characteristics, depth of substrate, depth of water) for the bog turtle. Grazing intensity in two of the areas may be increased from 1 animal unit per 0.6 ha (1.5 acres) to a maximum of 2 animal units per 0.4 ha. (1 acre) in order to assess bog turtle response to higher grazing intensities. Grazing intensities in the remaining 8 study areas will be maintained at their current levels. Other considerations for selection of final study areas will be size of the wetland, bog turtle population size, and feasibility of working with the agricultural lessee.

Cattle exclosures will be erected in each of the study areas. Two exclosure sizes will be used: 10 m x 10 m (30 ft x 30 ft.) and 30 m x 30 m (100 ft x 100 ft). Exclosures will be constructed out of locust or metal fence posts and 12-gauge barbwire and will be constructed at a height sufficient to exclude cattle. In larger areas, 3-4 of the small (10 m x 10 m) exclosures may be set up. Exclosures would allow us to measure changes in habitat quality in areas without cattle.

Radio telemetry will be used to monitor bog turtle responses to various levels of grazing in 2-3 study areas. Turtles will be captured by visually searching and probing within habitat areas and through the use of live traps. Traps are handmade funnel traps approx. 10-15 cm in diameter made of window screening. The traps will be set in small streams and small open bodies of water within the study areas and will be checked 1-2 times daily. Captured adult turtles will be weighed and measured and fitted with single-staged radio transmitter with 90-165 days of life. The radios typically measure 15 x 25 x 10 mm with 15-18 cm antenna and weigh approximately 4.5 grams before attachment. All radios will be attached to the right or left plural scute of the turtle, with the antenna extending caudally (Carter, 1997). Radios will be attached to the carapace of the turtle using 5-minute

epoxy putty. Turtles will be weighed a second time after attachment of the transmitter to insure that the transmitter weight does not exceed the recommended 7% of body weight guidelines (Carter, 1997). Radioed turtles will be monitored 2-3 times per week, throughout the study period.

All bog turtle capture activity will be according to guidelines established by Carter (1997) and will be closely monitored by the biologists from the Virginia Department of Game and Inland Fisheries.

AFFECTED ENVIRONMENT

PARKWAY-WIDE OVERVIEW

The Blue Ridge Parkway follows the high crests of the central and southern Appalachians for 469 miles from Shenandoah National Park in Virginia to the Great Smoky Mountains National Park in North Carolina. Its breathtaking scenic beauty, unbridled natural resources, and unique historic sites make it the showpiece rural parkway of the National Park Service. But the Parkway is also notable as a remarkable landscape architecture and engineering achievement. Design of the Parkway began in 1934. More than 50 years in the making, the Parkway was completed in 1987 with the construction of a 7.5-mile section around the rugged and winding terrain of Grandfather Mountain.

The Parkway intersects three mountain provinces (ridge, plateau, and highlands) and extends almost 4 degrees in longitude and 2½ degrees in latitude, the third largest geographic range of any unit in the national park system. Yet, despite this extent, its width averages only 800 feet wide between developed areas.

The Parkway occupies 88,000 acres of lands within the socio-political boundaries of two states, six congressional districts, 12 counties in Virginia, 17 counties in North Carolina, 185 miles within two national forests, 11 miles within an Indian Reservation, two state parks, nine watershed basins, a dozen municipal watersheds, and three metropolitan areas. There are more than 1,200 miles of boundary and 4,000 adjacent property owners. Three interstates, 270 secondary roads, and 400 utility lines bisect natural features. Like beads on a necklace, 900 vistas, 275 paved overlooks, 18 recreational areas, 14 backcountry areas (ranging from 1,000 to 5,000 acres), and 13 maintenance facilities line the Parkway to accommodate visitors. With annual use approaching 20,000,000 people, it is the most highly visited unit in the National Park System.

Parkway natural resources include 300 streams (150 headwaters), 1,250 vascular plants species (50 rare or endangered), six rare or endangered animals, a variety of slopes (mostly steep) and exposures, possibly 100 different soil types, an elevation range of 5,700 vertical feet, and 100 exotic plants. The Parkway also bisects 47 natural heritage areas, which includes more than half of the high-elevation wetlands known in North Carolina.

The primary activity is recreational driving, sight seeing and hiking. The Parkway also provides naturalist walks and talks, self-guided nature trails, roadside exhibits, picnicking, and camping.

PLATEAU/HIGHLANDS DISTRICT OVERVIEW

The Plateau and Highland Districts together comprise 200-miles bound to the north by the Roanoke Valley/Roanoke River Basin and to the south by Grandfather Mountain, a privately owned biosphere reserve.

The Roanoke Valley is the largest metropolitan area along the Blue Ridge Parkway. The Roanoke Metropolitan area consisting of Roanoke City, Roanoke County, the City of Salem, and the town of Vinton, boasts a population of approximately 220,000. Roanoke is an important employment center for southwestern Virginia. Important employers in the Roanoke Valley include retail and service industries as well as light manufacturing. Residential development has rapidly spread outward from the Roanoke City and Roanoke County and is causing increasing pressure on the Parkway and its natural resources.

South of the Roanoke Valley consists of rolling agriculture lands dotted with farmsteads, pastures and small rural communities. Most lands near the project areas are privately owned, rural countryside, consisting primarily of farms and private dwellings. Small towns of a few hundred people dot the fringes, providing economic and cultural variety to an otherwise agriculturally dominated area. Mixed agriculture, tourism and light manufacturing are important employers. The Parkway follows the edge of the Blue Ridge Escarpment throughout much of this section.

Just south of the Virginia/North Carolina State line, adjacent lands are dominated by rural countryside, primarily farming and private dwellings. Mixed agriculture, tourism, and light manufacturing are important employers. Small towns of a few hundred people dot the fringes of this section, providing economic and cultural variety to an otherwise agriculturally dominated area. Larger towns in this section include the towns of Blowing Rock with a population of 2,370 and Boone with a

population of 25,000 in Watauga County and Sparta in Alleghany County. Also, visitors from larger metropolitan areas such as Hickory (population 28,000) and Charlotte (population 396,000) are within one- and two-hour drives respectively.

The Plateau and Highlands Districts contain a rich and diverse grouping of Parkway cultural resources. Within the Plateau District are the Kelly School complex of structures, the Rocky Knob cabins, the ever-popular Mabry Mill and its associated outbuildings, and various springhouses and other historic structures. In the Highlands District, the Brinegar Cabin buildings are the only Parkway historic structures listed in the National Register of Historic Places. Toward the southern end of the district is the Moses H. Cone Memorial Park with its rich mosaic of historic buildings, carriage trails and cultural landscape features. Certain Parkway design features in these districts can also be considered cultural resources including the impressive wooden fences of the Plateau District, the historically significant Cumberland Knob Visitor Center, as well as various stone-faced bridges and tunnels. The renowned Linn Cove Viaduct stands alone as a superlative engineering and design achievement, reflecting the tradition of innovative design and engineering accomplishments of the Parkway's founders.

None of these various Plateau District and Highland District cultural resources, whether historic structures or Parkway design elements, will be adversely affected.

PROPOSED PROJECT AREA OVERVIEW

Natural Environment

The proposed study areas are along the Blue Ridge Parkway in the southern part of Virginia (Floyd, Patrick, Carroll and Grayson Counties) and the northern part of North Carolina (Allegheny, Ashe, Wilkes and Watauga Counties). Elevations range from a low of 770 m (2,550 ft.) to 1,182m (3,900 ft.).

The majority of the areas are grazed wet meadows associated with spring seepages and small streams. Typical vegetation includes sphagnum moss (*Sphagnum sp.*), spike rush (*Eleocharis sp.*), bulrush (*Scirpus sp.*), rush (*Juncus sp.*), smooth alder (*Alnus serrulata*), and red maple (*Acer rubrum*).

Topography/Soils - Nearly all of the wetlands and seepage's in this study are located in relatively level floodplains with grades less than 2% over the length of the wetlands. The remaining areas include hillside seepage's that may approach a grade of 10%, especially in those areas associated with headwater sections of streams. No prime farmland soils are known to occur within or adjacent to the wetland areas.

Water Resources - The wetlands in the study generally consist of sphagnaceous wetlands, marshes, wet meadows and pastures that are generally associated with springs, rivulets or a small creek. The wetlands generally range in size from about 0.10 ha to 1.2 ha (0.25 - 3 acres) in size. Ditches dug by humans to drain the wetlands for agriculture or historically for Parkway drainage are a common feature in most of the study areas. Few of the wetlands/bog turtle areas are pristine. Several areas are actively colonized by beavers, which have flooded all or portions of the wetlands creating substantial impoundments.

Many of the wetlands/streams in this project are located in livestock pastures, which have been grazed since the early 1900's. In many cases, grazing activities were allowed to continue under lease agreements as part of the Parkway's agricultural lease program. This agricultural lease program was started by early Parkway Landscape Architects in order to preserve and improve the rural landscape.

Most of the streams within the proposed study areas are first or second order streams, ranging in size from headwater seeps to streams approximately 3 m. (10 ft.) across. The proposed study areas are located in several watersheds, draining both to the east and to the west of the Parkway, including the New River, Roanoke, Yadkin-Pee Dee, and Watauga drainages.

Plant Species - Most of the areas have extensive alder stands. There is little or no overhead canopy cover in the wetlands. Nearly all of the areas are separated by patches of mixed deciduous and pine (white pine) forest and areas of agricultural land. Typical plant species found within these wetlands include: sphagnum moss (*Sphagnum sp.*), spike rush (*Eleocharis sp.*), bulrush (*Scirpus sp.*), rush (*Juncus sp.*), smooth alder (*Alnus serrulata*), and red maple (*Acer rubrum*). (See Appendix A for a partial species list of plants found in Parkway wetlands.)

Animal Species – Animal species that would be impacted by this study are primarily aquatic species that would be found in wetlands or grassland species that would occupy drier portions of these areas. Common wildlife species found in wetlands along the Parkway include: white-tailed deer, beaver, muskrat, raccoon, meadow vole, star-nosed mole, great blue heron, wood duck, woodcock, belted kingfisher, red-winged blackbird, common phoebe, northern water snake, northern copperhead, spring salamander, mud salamander, northern dusky salamander, seal salamander, pickerel frog, green frog, spring peeper, gray tree frog, American toad, box turtle, snapping turtle, and the bog turtle.

Special Status Species (Bog Turtle) – Northern bog turtle populations (from Maryland north) are currently classified as Threatened under the Endangered Species Act (ESA). For the purpose of regulating illegal commercial collection, southern bog turtle populations (from Virginia south) are also classified as Threatened under the ESA due to similarity of appearance to the northern populations (USFWS 1997).

The bog turtle is listed as endangered in nearly every state within its range, including Virginia, and is listed as threatened in North Carolina. The bog turtle inhabits small upland wet meadows, seepage's and bogs. Southern Appalachian bogs and wetlands are considered to be rare communities (Herman 1998). The bog turtle is threatened by loss of habitat resulting from development and agricultural activities as well as over collection.

Cultural Environment

The Plateau and Highlands Districts contain a rich and diverse grouping of Parkway cultural resources. Within the Plateau District are the Kelley School complex of structures, the Rocky Knob Cabins, the ever-popular Mabry Mill and its associated outbuildings, and various springhouses and other historic structures. In the Highlands District, the Brinegar Cabin buildings are the only Parkway historic structures listed in the National Register of Historic Places. Toward the southern end of this district is the Moses H. Cone Memorial Park with its rich mosaic of historic buildings, carriage trails and cultural landscape features. Certain Parkway design features in these districts can also be considered cultural resources including the impressive wooden fences of the Plateau District, the historically significant Cumberland Knob Visitor Center, as well as various stone-faced bridges and tunnels. The renowned Linn Cove Viaduct stands alone as a superlative engineering and design achievement, reflecting the tradition of innovative design and engineering accomplishments of the Parkway's founders.

None of these various Plateau District and Highland District cultural resources, whether historic structures or Parkway design elements, will be adversely affected by development of the bog turtle species management and habitat protection plans as outlined here. As area-specific bog turtle protection plans are developed and implemented at historic scenes, each of these plans should be carefully evaluated as to its potential effects on that particular scene and modified, where needed, to protect the integrity of the historic scene.

ENVIRONMENTAL CONSEQUENCES

IMPACTS

The principal impacts, including the unavoidable impacts, of the alternatives would be as follows:

No Action Alternative

Natural Resources

Under this alternative the evaluation of livestock grazing and habitat assessment of bog turtle areas along the Blue Ridge Parkway would not be funded and would not be carried out. Cattle would likely continue to be grazed at these areas at the current levels. Parkway management would not benefit from the knowledge of how cattle grazing affect the bog turtle and its habitat.

Cultural Resources

Parkway cultural resources would not be impacted since no action would be planned under this alternative.

Alternative 1 – Manipulate Grazing Intensities

Natural Resources

Under this alternative, grazing levels would be temporarily increased from 1 animal unit per 0.6 ha (1.5 acres) to a maximum of 2 animal units per 0.4 ha (1 acre) within 5 of the 10 study areas containing known or potential bog turtle habitat. Light to moderate grazing is generally believed to be beneficial to bog turtle habitat and serves to maintain wet meadows in early successional stage by preventing woody plant encroachment. However, heavy grazing may be detrimental to bog turtle habitat. Heavy grazing frequently results in close cropping of vegetation exposed or denuded soil conditions, and compaction of the soil substrate. In addition, the increased density of cattle would likely increase the risks of turtles being trampled or injured by cattle.

There will be a temporary loss of small areas of grazed land within the study areas where fences are built to exclude cattle from a portion of the wetland. Erecting fences to exclude cattle from portions of the wetlands would likely cause a short-term change in vegetation, as vegetation within the exclosure would not be subject to browsing by cattle. Significant change in vegetation structure is not expected due to the short nature of this study (2 years of fieldwork).

Implementing this alternative would be complex because of the small size of many of the areas, the amount of coordination involved in implementing the different grazing levels among the various agricultural lessee's, and the limited funds available to compensate lessee's for modifying grazing levels for this project.

Cultural Resources

None of these various Plateau District and Highland District cultural resources, whether historic structures or Parkway design elements, will be adversely affected by the action plan as outlined here, and is therefore in compliance with laws and regulations concerning Parkway management of cultural resources.

Alternative 2—Comparison of Grazed and Ungrazed Within Each Study Area

Natural Resources

Under Alternative 2, cattle numbers would not be significantly increased above their current levels within the individual agricultural leases and bog turtle areas. Prior to undertaking the study, study areas will be assessed to determine their current habitat conditions and rated as intensively (heavily) grazed, moderately grazed or lightly grazed. For the purposes of this study, grazing levels would be maintained at their current levels. Current areas that are heavily grazed would likely continue to be heavily grazed.

There will be a temporary loss of small areas of grazed land within the study areas where fences are built to exclude cattle from a portion of the wetland. Erecting fences to exclude cattle from portions of the wetlands would likely cause a short-term change in vegetation, as vegetation within the exclosure would not be subject to browsing by cattle. Significant change in vegetation structure is not expected due to the short nature of this study (2 years of fieldwork).

Because grazing levels would not be modified from their current levels, no impacts to bog turtle habitat within the study areas is expected. This alternative however, would not give researchers the design flexibility to increase cattle densities necessary to determine how bog turtles react to higher grazing intensities.

Cultural Resources

None of these various Plateau District and Highland District cultural resources, whether historic structures or Parkway design elements, will be adversely affected by the action plan as outlined here, and is therefore in compliance with laws and regulations concerning Parkway management of cultural resources.

Alternative 3—The Environmentally Preferable Alternative - Combination of Manipulating Grazing Intensities and Comparison of Grazed and Ungrazed Areas

Natural Resources

Under this alternative potential negative impacts to bog turtle habitat should be minimal. Grazing intensity may be increased from 1 animal unit per 0.6 ha (1.5 acres) to 2 animal units per 0.4 ha (1 acre) in 2 of the 10 study areas in order to carry out a controlled comparison of different grazing intensities. Increased cattle densities at these two areas could result in temporary loss of some vegetative cover due to close cropping of plant species, compaction of substrate due to numerous hoof prints, and increases in nutrient loading due to cattle feces.

There will be a temporary loss of grazed land in the agricultural leases where fences are built to exclude cattle from a portion of the wetland. Erecting fences to exclude cattle from portions of the wetlands would likely cause a short-term change in vegetation, as vegetation within the exclosure would not be subject to browsing by cattle. Significant change in vegetation structure is not expected due to the short nature of this study (2 years of fieldwork). Also, bog turtles will be able to pass through the fence that will be used in this project, so there would be no appreciable change in their ability to move from place to place.

Impacts to Bog Turtle

The increased density of cattle would likely increase the risks of turtles being trampled or injured by cattle. Turtle injury from cattle is a possibility whenever grazing occurs within an area occupied by bog turtles. Every precaution (e.g. regular monitoring of cattle herd size and of the wetland itself) will be taken to insure this does not occur. Intense grazing for the purposes of this study would be kept at the low end of the “heavy grazing” scale and would only be undertaken for short periods of time in order to avoid any irreparable impacts to the wetlands. The Virginia Department of Game and Inland Fisheries, Virginia Tech, and the National Park Service will closely monitor grazing and cattle impact to the study areas. If impacts from cattle cause unnecessary habitat damage, then all cattle will be removed from the area immediately. Cattle numbers and density in the remaining 8 study areas will not be increased above their current levels.

Since the bog turtle is listed as threatened due to similarity of species, no formal Section 7 consultation is required with U.S. Fish and Wildlife Service (Andy Moser, Annapolis Field Office; William Hester, Gloucester Field Office--USFWS, pers. comm.). Preliminary discussions with Carole Copeyon, Endangered Species

Biologist (USFWS) involved in bog turtle recovery, suggest that NPS preferred alternatives should not have an adverse impact on bog turtle populations. The proposal does recommend radio-telemetry of 10-12 turtles, but according to USFWS, does not constitute "take" by their definitions. Consequently, a permit will not be required.

The Blue Ridge Parkway prefers this alternative because it would give researchers flexibility in designing and carrying out the project while minimizing impacts to the bog turtle's habitat (see Table 1).

Table 1. Matrix of Alternatives

ALTERNATIVE	NO. CONTROL AREAS	NO. STUDY AREAS	PROPOSED GRAZING INTENSITY	NO. RADIO TELEMETRY AREAS
Alt 1	5	5	1/acre	2
Alt 2	0	10	1/1.5 acres (current condition)	2
Alt 3 (Environmentally preferable alternative)	**8**	**2**	**2/acre**	**2**
No Action	--	--	--	--

Cultural Resources

None of these various Plateau District and Highland District cultural resources, whether historic structures or Parkway design elements, will be adversely affected by the action plan as outlined here, and is therefore in compliance with laws and regulations concerning Parkway management of cultural resources.

Impairment to Resources

The National Park Service may not allow the impairment of park resources and values unless directly and specifically provided for by legislation or by the proclamation establishing the park. Impairment that is prohibited by the National Park Service Organic Act and the General Authorities Act is an impact that, in the professional judgment of the responsible National Park Service manager, would harm the integrity of park resources or values, including the opportunities that otherwise would be present for the enjoyment of those resources or values.

(Director's Order 55, "Interpreting the National Park Service Organic Act," Section 3.5)

Consequently, the environmentally preferable alternative conserves values embodied in the Organic Act to:

- Accomplish the mission of the National Park Service.
- Achieve goals of the *Parkway Master Plan* and *Strategic Plan.*
- Achieve the purposes and criteria of the Parkway's long-range goal to develop a conservation and management plan in cooperation with the VDGIF and the NCWRC and others for the bog turtle and its wetland habitats along the Parkway.
- Prevent impairment of park resources in a manner that meets legal and policy requirements.

Secondary Impacts

Visitor use at these areas will be temporarily impacted. The view of the pastures with new temporary fences installed will be altered for visitors driving the Parkway. Increased height of vegetation within the exclosures will also alter the view of the pasture.

Cumulative Impacts

This project is the start of an effort by the Blue Ridge Parkway in conjunction with the Virginia Department of Game and Inland Fisheries, North Carolina Wildlife Resources Commission, the University of Richmond and Virginia Tech to develop a Conservation Plan for the Bog Turtle along the Blue Ridge Parkway. The results of this study will be used to modify/improve grazing practices within agricultural leases containing bog turtle habitat. As grazing practices are improved, there should be overall improvement in vegetative cover and structure, soil and mud depth and habitat conditions for the bog turtle.

This project will improve the sustainability of the Parkway's agricultural lease program by allowing us to determine what levels of grazing are most beneficial to bog turtle populations and habitat. Results of this study should help other agencies in management of grazed areas containing bog turtle habitat

There are negligible cumulative effects on natural and cultural resources or visitor experience that will occur as a result of implementing any of the alternatives.

MITIGATING MEASURES

NATURAL ENVIRONMENT MITIGATION MEASURES

Intense grazing for the purposes of this study would be kept at the low end of the "heavy grazing" scale and would only be undertaken for short periods of time in order to avoid any irreparable impacts to the wetlands.

Trapping and attaching radio transmitters to study animals will be carried out according to well-established procedures and guidelines as outlined by the Carter (1997), the Virginia Department of Game and Inland Fisheries, and Virginia Tech.

Fences and cattle exclosures will be constructed by hand. No motorized or heavy equipment will be permitted within wetlands, and bog turtle habitat at any time. The fences will be removed at the end of the study.

The Virginia Department of Game and Inland Fisheries, Virginia Tech, and the National Park Service will closely monitor construction of exclosures and grazing and cattle impact within the study areas. Dr. Joseph Mitchell, University of Richmond, will be a consulting Biologist for this study.

CULTURAL ENVIRONMENT MITIGATION MEASURES

There are no anticipated effects to cultural resources from development of management plans for protection of bog turtles and their habitat on the Parkway. It is in the plan implementation phase, a logical outgrowth of the plan development efforts, that measures taken to protect bog turtles and their habitat could affect historic resources and cultural landscapes. At both Rakes Mill Pond and Mary Mill Pond in the Plateau District special consideration had to be given as to how best to rehabilitate the sediment-filled basins. Wetland and bog plant species had started to thrive at these areas and there were even proposals to not refill these historic ponds and allow them to further re-vegetate. Eventually compromise solutions were developed, the ponds were rehabilitated and refilled, and bog turtle habitat protected. In the future we will need to utilize the same kind of balanced planning and project implementation in order to achieve the dual goals of protection of the historic scene/cultural landscape as well as ensuring the survival of the bog turtle species and habitat.

CONSULTATION AND COORDINATION

Shawn L. Carter, Graduate Research Assistant, State University of New York, Syracuse, New York

Carole Copeyon, Endangered Species Biologist/Bog Turtle Recovery Coordinator, U. S. Fish & Wildlife Service, State College, Pennsylvania

Dr. Carola Haas, Department of Fisheries & Wildlife Sciences, Virginia Tech, Blacksburg, Virginia

Dennis W. Herman, Coordinator of Living Collections, NC Museum of Natural Sciences, Raleigh, North Carolina

William Hester, Acting Endangered Species Biologist, U.S. Fish & Wildlife Service, Gloucester, Virginia

Dr. Joseph C. Mitchell, Consulting Ecologist, Richmond, Virginia

Andy Moser, Endangered Species Biologist, U.S. Fish & Wildlife Service, Annapolis, Maryland

Mike Pinder, Aquatic Nongame Biologist, Virginia Department of Game & Inland Fisheries, Blacksburg, Virginia

Dr. Steve Roble, Staff Zoologist, Virginia Department of Conservation & Recreational Resources, Richmond, Virginia

Tom Thorp, Three Lakes Nature Center & Aquarium, Richmond, Virginia

PLANNING TEAM/PREPARERS

Tom Davis, Plateau District Natural Resource Management Specialist

Bob Cherry, Highlands District Natural Resource Management Specialist

Bambi Teague, Supervisory Natural Resource Management Specialist

Allen Hess, Park Cultural Resource Management Specialist

Suzette Ramsey, Environmental Compliance Specialist

LITERATURE CITED

Carter, S.L. 1997. Movements, home range, and habitat preference assessment of bog turtles (*Clemmys muhlenbergii*) in southwestern Virginia. Master's Thesis, Virginia Polytechnic Institute and State University, Blacksburg, VA. 97 pp.

Carter, S.L. 1998. Site quality analysis (SQA) methods for the standardized assessment of bog turtle (*Clemmys muhlenbergii*) habitat quality at local broad geographic scales. Unpubl. report to the Virginia Department of Game and Inland Fisheries. 23 pp.

Davis, G.T. 1995. Blue Ridge Parkway, Rocky Knob District, 1995 bog turtle Survey. Unpubl. report to the Blue Ridge Parkway. 42 pp.

Herman, D.W. 1994. The bog turtle, *Clemmys muhlenbergii*, in North Carolina—An action plan for its conservation and management. Unpubl. report to the North Carolina Wildlife Resources Commission. 156 pp.

Herman, D.W. 1994. 1998. Status and distribution of the bog turtle, *Clemmys muhlenbergii*, in Virginia. Unpubl. report to the Virginia Department of Game and Inland Fisheries. 12 pp.

Klemens, M.W. 1993. Standardized bog turtle site quality analysis. Unpublished report to the U.S. Fish & Wildlife Service.

Mitchell, J.C. 1994. The reptiles of Virginia. Smithsonian Institute Press, Washington, D.C. 352 pp.

Mitchell, J.C. and K.A. Buhlmann. 1991. Distribution and status of the endangered bog turtle (*Clemmys muhlenbergii*) on the Blue Ridge Parkway in Virginia. Unpubl. report to the National Park Service. Asheville, N.C. 78 pp.

Nemuras, K.T. 1974. The bog turtle: profile of an endangered species. Virginia Wildlife 35: 7-9.

Tryon, B.W. 1992. Bog turtle (*Clemmys muhlenbergii*) work in Virginia, during 1991 and 1992, as carried out under permit number ESCP9120. Unpubl. report to the Virginia Department of Game & Inland Fisheries. 15 pp.

U.S. Fish and Wildlife Service. 1997. Endangered and threatened plants: Final rule to list the northern population of the bog turtle as threatened and the southern population as threatened due to similarity of appearance. The Federal Register 62:59605-59623.

Appendix A

A search of Parkway databases and consultation with the Virginia Department of Natural Heritage and the North Carolina Division of Natural Heritage indicate the presence of 16 species of rare or threatened plants, which typically occur in bog turtle areas in the Plateau and Highlands Districts of the Blue Ridge Parkway.

Plant Species	NC Status	VA Status	Federal Status
Arisaema triphyllum (Bog Jack-in-the-Pulpit)	Significantly Rare		
Carex baileyi (Bailey's Sedge)	Watch List		
Carex echinata ssp. echinata (Star Sedge)	Watch List		
Chelone cuthbertii (Cuthbert's turtlehead)	Significantly Rare	Very Rare	
Dalibarda repens (Dewdrop)	Endangered	Special Concern	
Dryopteris cristata (Crested Woodfern)	Watch List		
Epilobium ciliatum (Purpleleaf Willowherb)	Significantly Rare		
Epilobium leptophyllum (Narrowleaf Willowherb)	Watch List	Special Concern	
Hydrocotyle americana (American Pennywort)	Watch List		
Juncus gymnocarpus (Seep Rush)	Watch List		
Lillium grayi (Gray's Lily)	Threatened—Special Concern	Undetermined	
Liparis loeselli (Fen Orchis)	Candidate	Special Concern	
Lonicera canadensis (American Fly-honeysuckle)	Significantly Rare	Special Concern	
Sanguisorba canadensis (Canada Burnet)	Significantly Rare	Special Concern	
Sparaganium chlorocarpum (Greenfruit Bur-reed)	Candidate	Special Concern	
Spiranthes lucida (Shining Ladies'-tresses)	Candidate	Special Concern	

Appendix B

Cooperative Agreement No. CA 514399119 for research entitled, "Evaluation of Livestock Grazing and Habitat Assessment of Bog Turtle Sites Along the Blue Ridge Parkway" between Virginia Polytechnic Institute & State University and the National Park Service

Cooperative Agreement No. CA 514399119

COOPERATIVE AGREEMENT

between

THE NATIONAL PARK SERVICE

and

VIRGINIA POLYTECHNIC INSTITUTE AND STATE UNIVERSITY

THIS COOPERATIVE AGREEMENT (herein the AGREEMENT) made and entered into this *30th d*ay of *Sept.* 1999, by and between the United States of America, acting by and through the National Park Service, U.S. Department of the Interior (hereinafter the SERVICE) and Virginia Polytechnic Institute and State University (herein after UNIVERSITY).

ARTICLE 1. BACKGROUND AND OBJECTIVES

WHEREAS, The Act of June 30, 1936, 49 Stat. 2041, 16 U.S.C. 460a-2, authorized the establishment of the Blue Ridge Parkway (hereinafter the PARKWAY); and

WHEREAS, the Omnibus Consolidated Appropriations Act of 1997, Public Law 104-208 (September 30, 1996), authorizes the NPS to use cooperative agreements for the purpose of supporting and stimulating park programs; and

WHEREAS, the PARKWAY, a legally authorized unit of the SERVICE, is committed to the SERVICE mandate to manage according to the strong natural resources preservation mandate of the Organic Act of 1916. The visitor should be afforded the opportunity to view natural scenes representative of the southern Appalachian region and BLRI must strive to preserve all of these factors; and

WHEREAS, Virginia Polytechnic Institute and State University is organized and maintained (1) to conduct a program of research, documentation, education and extension with regards to the entire range of subject fields in biology, including wildlife biology, and (2) to make available to other educational and local, state, regional and federal agencies, private organizations and individuals information and technical assistance regarding its many program activities; and

WHEREAS, the tasks authorized by this cooperative agreement will provide necessary substantiating data to park employees on the habitat requirements of the Federally Threatened bog turtle *(Clemmys muhlenbergii),* including impacts of grazing on bog turtle habitat and populations, and measurement of baseline habitat

conditions of known bog turtle sites along the PARKWAY in Virginia and North Carolina. This information will provide substantiating data that will allow park staff to develop a Bog Turtle Conservation and Management Plan for the BLRI and will allow park staff to initiate a long-term monitoring program of bog turtle habitat.

WHEREAS, the objectives of this project are:

- to assess the impacts of livestock grazing on bog turtle populations and habitat at 12 sites along the PARKWAY in Virginia and North Carolina using cattle exclosures.
- to monitor bog turtle responses (using radio telemetry) to various levels of grazing at two of the above cattle exclosure sites along the Parkway.
- to collect baseline habitat measurements at known bog turtle sites in Virginia and North Carolina.
- to provide recommendations for management of bog turtle populations and habitat; and

NOW THEREFORE, in consideration of the mutual benefit in attaining the common objectives stated herein, and for other good and valuable consideration, the PARKWAY and UNIVERSITY hereby mutually agree to accomplish the objectives as set forth below in Article II.

ARTICLE II. STATEMENT OF WORK

A. UNIVERSITY agrees:

Phase I.

1. Assess the impacts of livestock grazing in a sample of known bog turtles sites along the PARKWAY in the following counties in Virginia:
   - Floyd
   - Patrick
   - Carroll
   - Grayson

   And possibly including sites along the PARKWAY in the following counties in North Carolina:
   - Allegheny
   - Watauga
2. In cooperation with PARKWAY employees, determine location of study sites where livestock exclosures will be constructed.
3. Collect habitat measurements and plant species composition within bog turtle study sites.
4. Monitor bog turtles in two study sites using radio telemetry.
5. Prepare narrative with species composition and habitat description of each study site.
6. Make a final oral presentation at PARKWAY Headquarters or other mutually agreed upon site about the study and results,
7. Provide original slides taken with funds provided by this project.

Phase II.

1. Analyze data and compile results into a final report and manuscript for submission to refereed journal.
2. Include management recommendations for individual sites, and agricultural leases.

B. The PARKWAY agrees to for Phases I and II:

1. Provide financial support to UNIVERSITY for work performed as outlined in this agreement.
2. Host, as soon as practicable after the execution of this Agreement, a "Project Kick-off Meeting" at PARKWAY headquarters, or mutually agreed upon location. At this meeting both parties will review the Scope of Work, any project-related issues or concerns, expected timetable for this project, permits, and any other pertinent questions or needs. The goal of the meeting will be to meet individual players in this agreement, to iron out any potential problems before they occur, and to minimize confusion or overlap of responsibilities, especially PARKWAY district personnel.
3. Assign the Plateau Natural Resource Program Manager as Government Technical Representative (GTR). The GTR will:
    a. Provide technical support, guidance and documentation, consultation and liaison with UNIVERSITY in connection with the bog turtle study,
    b. Determine limits and boundaries of each study site,
    c. Collaborate with UNIVERSITY to carry out and accomplish the study cited in this Agreement, and
    d. Provide base maps, as mutually determined, for field work and final document/mapping.
4. Provide labor and materials for installation of livestock exclosures.
5. Review and provide comments on the 100% draft (or earlier version if so desired by UNIVERSITY) before finalizing.
6. Distribute the final document to agencies and organizations deemed appropriate by the PARKWAY.

C. That all activities herein shall be conducted in accordance with the Scope of Work entitled "Evaluation of Livestock Grazing and Habitat Assessment of Bog Turtle (Clemmys muhlenbergii) Sites Along the Blue Ridge Parkway" attached hereto and made a part of this AGREEMENT as Attachment A.

ARTICLE III. KEY OFFICIALS/REPRESENTATIVES

A. Tom Davis, Natural Resource Program Manager, National Park Service, Blue Ridge Parkway, is hereby designated the Government Technical Representative (GTR) for this AGREEMENT and shall review both draft and final products thereof. The GTR shall also verify receipt of all deliverables, review SF 270 "Request for Advance or Reimbursement," and forward approved SF 270's to the SERVICE Contracting Officer at the address listed in B. below. The GTR may be reached at the following address and telephone number:

Tom Davis
Blue Ridge Parkway
1670 Blue Ridge Parkway
Floyd, VA 2409 1-3932
Phone: (828) 271-4779 ext. 209
E-mail: <G_Tom_Davis@nps.gov>

B. Sharon Carson shall serve as the SERVICE's Contracting Officer. The Contracting Officer may be reached at:

Contracting Officer
National Park Service
100 Alabama Street, SW
Atlanta, GA 30303
Phone: (404) 562-3163 x 537
FAX: (404) 562-5236
E-mail: sharon_carson@nps.gov

C. Dr. Carola Haas, Associate Professor of Fisheries and Wildlife Sciences at Virginia Polytechnic Institute and State University will serve as UNIVERSITY'S Principle Investigator (P.I.). The P.I. may be reached at the following address, telephone number and e-mail:

Dr. Carola Haas
Department of Fisheries and Wildlife Sciences
Virginia Tech (0321)
112 Cheatham Hall
Blacksburg, VA 24061
Phone: (540) 231-9269 E-mail: cahaas@vt.edu

ARTICLE IV. TERMS OF AGREEMENT

This AGREEMENT shall be in effect from the date of the last signature and shall continue in full Force and effect until termination. This AGREEMENT shall terminate on December 31, 2002.

ARTICLE V. AWARDS/PAYMENTS

ARTICLE VI. REPORTS AND DELIVERABLES

The following deliverables shall be submitted according to the following schedules:

Phase 1:	Not Later Than:
Kick-off Meeting	March 31, 2000
Investigator's Annual Report	January 31,2001
Phase 2:	
Draft Final Report	December 31, 2001
Investigator's Annual Report	January 31, 2002
Final Report (Final Report, Executive Summary, Management Recommendations, Slides)	March 31, 2002
Investigator's Annual Report	January 31,2002

ARTICLE VII. PROPERTY UTILIZATION AND DISPOSITION

Property management standards shall be prescribed in OMB Circular A- 110 and the "Common Rule," 43 CFR Part 12. Subpart F, Paragraph 12.930.

ARTICLE VIII. PRIOR APPROVAL

Prior approval shall be in accordance with OMB Circular A-10 and the "Common Rule", 43 CFR Part 12, Subpart F, paragraph 12.925. Specifically, the following actions will require prior approval from the GTR:

1. Location and extent of cattle exclosures within study sites.
2. Preparation and submission of a manuscript for any professional publication or any form of publication using information gathered during this study.
3. Distribution by VIRGINIA TECH of the results of this study.

ARTICLE IX. FINANCIAL/ADMINISTRATIVE REPORTS

It is hereby understood and agreed to by the parties hereto that during the performance of this AGREEMENT, the SERVICE and UNIVERSITY will be bound by the provisions contained in OMB Circulars A-2l, A-34, A-89, A-110 (REV 11-93), and A-133, pertaining to administrative and financial reporting requirements.

ARTICLE X. TERMINATION

A. Termination of this AGREEMENT is ONLY in accordance with OMB Circular A-110 and the "Common Rule," 43 CFR Part 12, Subpart F, Paragraphs 12.960-12.962. The university would be given a 30-day written notice in event of contract cancellation.

B. This AGREEMENT constitutes the full, complete, and entire agreement between the parties hereto. No modifications or amendment shall be binding on either party unless such modification or amendment is in writing, executed by duplicate by both parties hereto, attached to this AGREEMENT, and incorporated in and by reference, made a part of this AGREEMENT.

ARTICLE XI. GENERAL AND SPECIAL/ADDITIONAL PROVISIONS

A. General Provisions

The general provisions incorporated by reference are the requirements of OMB Circular A-110, as codified by 43 CFR Part 12, Subpart F, "The Common Rule." Additional provisions include:

- Drug-Free Workplace Requirements, 43 CFR Part 12, Subpart D, Chapter 12.600 through 12.630.
- Government Debarment and Suspension (Non-Procurement), 43 CFR Part 12, Subpart D., Chapter 12.100 through 12.510.
- Restrictions on Lobbying Disclosure Requirements, 43 CFR Part 18.
- MBE/WBE Utilization Under Federal Grants, Cooperative Agreements, and Other Federal Assistance Agreements, *505* DM 3.6(E) (2).
- Limitation on Payments to Influence Certain Federal Transactions, FAR 52.203-12.
- Civil Rights Assurance Requirements, Title VI, Civil Rights Act of 1964, 42 U.S.C. C.2000d.1.

B. The following certifications are required in accordance with the above additional Provisions and are attached hereto and made part of this AGREEMENT. The UNIVERSITY shall execute these certifications prior to the award of the AGREEMENT.

- Certification Regarding Debarment, Suspension and Other Responsibility Matters, Drug-Free Workplace Requirements, Department of the Interior Form DI-2010 (Attachment C).

- UNIVERSITY'S contractors and subcontractors shall execute, prior to award of any contracts and subcontracts entered into for the benefit of this AGREEMENT, the Department of the Interior Form DI-2010, Part B., as described above.

C. Special Provisions

UNIVERSITY shall not publicize, or otherwise circulate, promotional material (such as advertisements, sales brochures, press releases, speeches, still and motion pictures, articles, manuscripts, or other publications), which states or implies Governmental Departmental bureau or Government employee endorsement of a product, service, or position, which UNIVERSITY represents. No release of information relating to this AGREEMENT may state or imply that the Government approves of UNIVERSITY'S work product, or considers UNIVERSITY'S work product to be superior to other products or services.

ARTICLE XII. ATTACHMENTS

Attachment A - Scope of Work

Attachment B - Budget/Financial Plan

Attachment C - Certifications Regarding Debarment, Suspension and Other Responsibility Matters, Drug-Free Workplace Requirements And Lobbying (DI-2010).

ARTICLE XIII. Authorizing SIGNATURES

IN WITNESS WHEREOF, the duly authorized representatives for the parties have affixed their signature on the dates herein below set out.

U.S. DEPARTMENT OF THE INTERIOR, NATIONAL PARK SERVICE

BY: //signed GARY EVERHARDT//
(Date) 9/27/99

Gary Everhardt
Superintendent
Blue Ridge Parkway

BY: //signed SHARON CARSON//
(Date) 9/29/99

Sharon Carson
Contracting Officer
Southeast Region

VIRGINIA POLYTECHNIC INSTITUTE AND STATE UNIVERSITY

BY: // signed H. T. Hurd //
(Date) 9/20/99
H. T. Hurd, Director Sponsored Programs

Appendix C
Public Comments Table

Name	Org.	Date	Comments	Park Comment/Change to EA
Dr. Dan Pittillo	WNC	2/24/00	1. In favor of the EA. 2. Questioned the detrimental effects of the project on *Lilium grayi* and other listed plant species. 3. What is the effect from previous pasture studies on Roan Mtn., or is there info from previous pasturing of the lilies?	None of the exclosures will include Gray's lily or other rare plant populations so there should be no adverse impacts. Vegetation inventories will be conducted prior to placement of exclosures. If rare plants move into an exclosure, we will fence individual stems so cattle cannot eat.
Shawn Carter	UNY	2/25/00	1. Agrees with proposed Alternative 3. 2. Suggest changing the titles of Alt. 2 & Alt. 3 to reflect a comparison of grazed and ungrazed areas *within* each site, since the titles imply a "comparison [between] grazed and ungrazed sites." 3. Baseline habitat measurements (pg 4) should also consider the potential problems of comparing wetlands unequal in area. 4. Suggest that sites should accurately reflect the possible range of grazing intensity found within known bog turtle sites for VA and NC.	We have incorporated comment #2 into the EA. Questions 3 & 4 are study design issues and will be forwarded to Dr. Carola Haas for consideration.
Mark Davis	NCWRC Habitat Conservation Program	3/2/00	1. Biological staff of NCWRC have reviewed draft EA and have no objection to preferred Alt. 3.	
Tom Thorp	Three Lakes Nature Center and Aquarium	3/7/00	1. Agrees with proposed Alternative 3. 2. Believes that 2 years is not sufficient time to determine effects—suggest minimum of 10 years. 3. If a general conclusion about the effects of grazing in the Southeast as a whole is being considered, suggest choosing some sites outside of VA and Floyd County. 4. One site that should be included is New Haven site: (MP 159.5). 5. If NC sites are considered, who will be responsible for monitoring? 6. Suggests working w/Chris McGrath & Nora Murdock. 7. Consider some seasonal grazing sites for study—winter-grazed sites would be most advantageous. Safety considerations should be taken for nesting sites & eggs if year-round grazing sites are to be used—control cattle access by fencing areas.	These are all methodology concerns - they will be forwarded to Dr. Haas for consideration. The length of study will not be changed since minimal funds are available to conduct this study. We agree the study should be longer and if funds become available we will continue the study for a longer period of time.

Name	Org.	Date	Comments	Park Comment/Change to EA
Dennis Herman	NC Museum of Natural Sciences	2/29/00	1. Agrees with proposed Alternative 3, but suggests following: a) Include a site or two where seasonal grazing is conducted—winter. b) If year-round grazing is allowed, use excluder fencing to protect nesting area(s). c) Since the study is so short, there may be no discernible differences between the turtles' utilization of the grazed or ungrazed portions of the site. Believes that during portions of the spring the turtles will be found foraging in cattle hoof prints or droppings consistently. d) Does not think anyone has been able to define "over grazing" so what determines the "low end" of the scale? e) Include way to measure the discharge flow from the springs & compare this from site to site. (See enclosed grazing report) f) Re-establish a grazing regime at New Haven site where some restoration work was attempted years ago. 2. Where along the BRP in NC is one going to find enough turtles to conduct a radio telemetry study? (See Herman's comments pg 3 of draft EA) 3. Are the traps mentioned in the draft EA the same design as those used by Carter? (See comments pg 4 of draft EA) 4. What is the goal of this study? 5. Shawn Carter's work was one of the best studies based in VA, but suggest using others' studies as resources as well, to make adequate conclusions on the Southeast. Study should be up to 10 years—2 years too short.	Question 1 is primarily related to methodology and will be forward to Dr. Haas for consideration. We will not try to address it in the EA. Question 2 - Simon Thomas and Shortt's Knob populations are of sufficient density to conduct telemetry studies. Question 3 - Yes Question 4 - we will add a paragraph to background at the end.
Ethel Eaton	VA SHPO	3/16/00	1. Requested copy of Section 106 form be sent. 2. Questioned Al's not consulting properly with SHPO office. **Note***A meeting was held in July 2000 w/SHPO & BLRI & included this discussion. Since then, SHPO has given approval of project.**	

Name	Org.	Date	Comments	Park Comment/Change to EA
Nora Murdock	USFWS	3/14/00	1. P.1-3rd paragraph: the bog turtle's official federal designation in the south is "Threatened Due to Similarity of Appearance." 2. P.3-last paragraph: excellent; specific sites for bog turtles should never be disclosed. 3. P.4-4th paragraph: do you mean, "weighed" here, instead of "weighted"? 4. P.8-4th paragraph: for clarity, we would suggest rewording this to read "The bog turtle is listed as endangered *by* nearly every state within its range, …as threatened *by* North Carolina." This clears up some of the confusion of over state and federal designations. 5. P.12-1st paragraph: We appreciate & commend you for your desire to not risk injury to bog turtles by increasing cattle density, nor to cause irreparable harm to the wetlands involved, however, be careful not to go so far that you bias your results. From our experience, bog turtle injuries from cattle, even in truly heavily grazed sites, are rare. 6. P.13-last paragraph: delete "the" before "Carter". 7. Appendix A: Gray's lily-unfortunately this species is declining toward the point where it may require federal listing in the not-too-distant future, so try to avoid it with the enclosures, if possible, or put fencing around it within study areas to keep cattle from eating it.	Question 1 - change EA to reflect correct designation Question 3 - Change "weighted" to "weighed" Question 6 - Agree Question 7 - Exclosures will be placed so they do not include Gray's lily. If Gray's lily moves into the exclosure, individual stems will be fenced so cattle cannot eat them.
Mary Ratnaswamy	USFWS	3/17/00	1. Conducting research into the benefits of various treatments (e.g. grazing) on veg/wetland suitability for bog turtles would provide important info for conservation of species. If funds are not sufficient to conduct Alt. 3 with sufficient replicates to address differences among treatments (e.g. different levels of grazing), recommend that project be conducted to compare "grazing" (at local, standard levels) to "non grazing."	

Name	Org.	Date	Comments	Park Comment/Change to EA
Ron Linville	NCWRC Habitat Conservation Program	3/1/00	1. Considers Alt. 3 to be the best option. 2. States that the following should be included in the EA: a) Steps should be taken to prevent rapid growth of woody veg in areas known to support bog turtles where cattle have been removed due to overgrazing. b) Fencing utilized for exclusion areas should be made of field wire instead of using barbed wire exclusively. Barbed wire can be strung along the top, if necessary. Field wire should be elevated above ground level by about 6 " to allow for the exclusion of cattle while allowing natural forage by smaller animals to continue. c) Traps utilized should be similar or equal to those currently being utilized by staff of the NC Natural Science Museum for bog turtle collection. Supervision should include the best practices available to insure viability of the turtles captured. Any capture mortality should be reported to the appropriate wildlife agency. d) Capture activity in NC should also be monitored by the NCWRC; coordinate w/Chris McGrath prior to finishing the EA. e) Bog turtle sites that are being impacted by beaver populations should be protected without undue delay thru beaver mgmt. Practices utilizing appropriate depredation permits or programs. f) Expanding the study for a period of longer than 2 years should be considered. g) Routinely coordinate efforts w/Chris McGrath, Dennis Herman, & Ann Somers. h) NCWRC concurs with Dennis Herman's comments of 2/29/00.	Fencing will be installed to allow for movement and forage of/by small animals. We will uses nested plots within the exclosure to offset any foraging impacts that could occur at or near the fenceline.

ACRONYMS AND GLOSSARY

A

affected environment: The existing biological, physical, cultural, social, and economic conditions of an area that are subjected to both direct and indirect changes, as a result of actions described within alternatives under consideration.

air quality: A measure of health and visibility-related characteristics of air, often derived from quantitative measurements of the concentrations of specific injurious or contaminating substances.

alternatives: A reasonable range of options that can accomplish an agency's objectives.

aquatic species: A group of closely related and interbreeding living things, living or growing in, on, or near the water.

archeological resources: Any material remains or physical evidence of past human life or activities, which are of archeological interest, including the record of the effects of human activities on the environment. Such resources are capable of revealing scientific or humanistic information through archeological research.

B

BLRI: Blue Ridge Parkway

C

carapace: A hard bony or protective outer covering, such as the fused dorsal plates of a turtle.

cooperative agreement (CA): A negotiated agreement between two or more entities to achieve specific management objectives.

Council on Environmental Quality (CEQ): The President's Council on Environmental Quality was established by the National Environmental Policy Act NEPA and is the agency responsible for the oversight and development of national environmental policy.

critical habitat: Habitat approved in the *Federal Register* as critical for a particular listed species under section 4 of the Endangered Species Act. (1) The specific areas within the geographical area occupied by the species at the time it is listed, on which are found those physical or biological features (a) essential to the conservation of the species and (b) which may require special management or protection (2) Specific areas outside the geographical area occupied by the species at the time it is listed that are considered essential to the conservation of the species.

cultural landscape: A geographic area (including both cultural and natural resources) associated with a historic event, activity, or person or exhibiting other cultural or aesthetic values.

cultural resource: An aspect of a cultural system that is valued by or significantly representative of a culture or that contains significant information about a culture. Properties such as landscapes or districts, sites, buildings, structures, objects, or cultural practices that are usually greater than 50 years of age and possess architectural, historic, scientific, or other technical value. By their nature, cultural resources are nonrenewable.

cumulative effects (impacts): Effects on the environment that result from the incremental impacts of an action when added to other past, present, and reasonably foreseeable future actions, regardless of which agency (federal or nonfederal) or person undertakes such actions. Cumulative effects can result from individually minor, but collectively significant, actions taking place over a period of time.

D

DEA: draft environmental assessment.

deciduous: Shedding or losing foliage at the end of the growing season.

degradation (natural resources): Refers to negative impact(s) to natural resources or natural processes. The impact may be singular or cumulative; the extent may be local or ecosystemwide. The term degradation is used broadly and may refer to: reduction in habitat size, reduction in extent of plant populations, declining species vigor exhibited as reduced population numbers, reduced reproductive success, increased mortality rates, and/or decreased percent of available habitat utilized.

denuded: To divest of covering; make bare.

E

EA: Environmental Assessment

environmental consequences: A section of an environmental assessment that is the scientific and analytic basis for comparing alternatives. This discussion includes the environmental effects of the alternatives, any adverse effects that cannot be avoided, and short-term, long-term and cumulative effects.

encroachment: An advance beyond proper or legal limits; intruding.

environmental assessment: A detailed statement required by the National Environmental Policy Act (NEPA) when an agency proposed a major action that could significantly affect the quality of the human environment.

endangered species: Any species which is in danger of extinction throughout all or a significant portion of its range. These species are listed by the U.S. Fish and Wildlife Service.

Endangered Species Act of 1973 (amended) (ESA): The Endangered Species Act ensures that no federal action will jeopardize the continued existence of federally listed or proposed threatened or endangered species of plant or animal.

epoxy: A high-strength adhesive, often made of two different materials that must be mixed together just prior to use.

ESA: Endangered Species Act

escarpment: A steep slope or long cliff that results from erosion or faulting and separates two relatively level areas of differing elevations.

ethnographic resources: A site, structure, object, landscape, or natural resource feature assigned legendary, religious, subsistence, or other significance in the cultural system of a group traditionally associated with it.

exclosure: An area from which livestock or other animals are excluded.

exotic plants: Plant or animal species introduced into an area where they do not occur naturally; non-native species.

F

facilities: Refers to buildings, houses, campgrounds, picnic areas, visitor-use areas, operational areas, and associated supporting infrastructure such as roads, trails, and utilities.

floodplain: Land on either side of a stream or river that is submerged during floods. Typically discussed in terms of 50, 100, or 500-year events.

100-year floodplain: The land adjacent to a river corridor that would be covered by water during a 100-year flood event. A 100-year flood event has a 1% probability of occurring during any given year.

foraging: The act of looking or searching for food or provisions.

Finding of No Significant Impact (FONSI): The public document following the preparation of a final environmental assessment that reflects the agency's final decision, rationale behind the decision, and commitments to monitoring and mitigation.

FWS: U.S. Fish and Wildlife Service

G

general management plan (GMP): The first tier plan for NPS units that provides overall broad management direction.

GPRA: Government Performance and Results Act

groundwater*: All water found below the surface of the ground.*

H

ha: Hectare.

headwaters: The water from which a river rises; a source.

historic district: A geographically definable area, urban or rural, possessing a significant concentration, linkage or continuity of sites, landscapes, structures, or objects, united by past events or aesthetically by plan or physical developments. A district may also be composed of individual elements separated geographically but linked by association or history.

hydrology: A science dealing with the properties, distribution and circulation of water on the surface of the land, in the soil and underlying rocks, and in the atmosphere.

I

impacts: Effects, both beneficial and adverse, of an action on the human environment. Direct effects are those occurring at the same time and place as the action itself. Indirect effects occur later in time or are farther removed in distance from the action, yet are reasonably foreseeable.

invasive native and exotic plants**: A species which takes over a new habitat where it was not previously found, often to the detriment of species which were there before.**

L

lessee: One that holds a lease.

M

mitigation: An activity designed to avoid, minimize, rectify, reduce or compensate the severity of, or eliminate impacts from the proposed project. A mitigation measure should be a solution to an identified environmental problem.

monitoring: To keep track of systematically with a view to collecting information.

museum collection: Objects, works of art, historic documents, and natural history specimens collected according to a rational scheme and maintained so they can be preserved, studied, and interpreted for public benefit.

N

National Environmental Policy Act of 1969 (NEPA): a law enacted on January 1, 1970 that established a national policy to maintain conditions under which humans and nature can exist in productive harmony and fulfill the social, economic and other requirements of present and future generations of Americans.

National Historic Landmark: A district, site, building, structure, landscape, or object of national historical significance, designated by the Secretary of the Interior under authority of the Historic Sites Act of 1935 and entered in the National Register of Historic Places.

National Historic Preservation Act of 1966 (NHPA): This act required federal agencies to give consideration to historic properties determined significant (properties listed on or determined to be eligible for the National Register of Historic Places) prior to expending funding for, authorizing, or licensing a federal project or permit.

National Natural Landmark Register: A program which seeks to identify and encourage the preservation of areas that illustrate the ecological and geological character of the United States.

National Park Service (NPS): An agency in the Department of the Interior responsible for protection and preservation of 384 natural and cultural units throughout the United States.

National Register of Historic Places: The comprehensive list of districts, sites, buildings, structures, and objects of national, regional, state, and local significance in American history, architecture, archeology, engineering, and culture kept by the National Park Service under authority of the National Historic Preservation Act of 1966.

natural resources: Features and values that include plants and animals, water, air, soils, topographic features, geologic features, paleontological resources, natural quiet, and clear night skies.

NEPA: National Environmental Policy Act

NCWRC: North Carolina Wildlife Resources Commission

NHPA: National Historic Preservation Act

no action alternative: An alternative in an environmental assessment that continues current management direction. A no action alternative is a benchmark against which action alternatives are compared.

nonnative species: Species of plants or animals that do not naturally occur in a particular area and of often interfere with natural biological systems. Also known as alien, introduced, or exotic species.

P

predation: The capturing of prey as a means of maintaining life.

preservation (cultural resource): The act or process of applying measures to sustain the existing form, integrity, and material of a historic structure, landscape, or object. Work may include preliminary measures to protect and stabilize the property, but generally focuses on the ongoing preservation maintenance and repair of historic materials and features rather than extensive replacement and new work.

preservation (natural resource): The act or process of preventing, eliminating, or reducing human-caused impacts to natural resources and natural processes.

R

rehabilitation (cultural resources): The act or process of making possible an efficient compatible use for a historic structure or landscape through repair, alterations, and additions while preserving the portions or features which convey the historical, cultural and architectural values.

rehabilitation (natural resources): All activities conducted to improve the quality or biologic function of an impacted natural resource. The term rehabilitation connotes a less extensive process than restoration. Site impacts may preclude a full restoration but project work is undertaken to enhance the extent or function of natural processes.

restoration (cultural): The act or process of accurately depicting the form, features, and character of an existing historic structure, landscape, or object as it appeared at a particular period of time, by removing modern additions and replacing lost portions of historic fabric, paint, or other elements.

restoration (natural): Work conducted to remove impacts to natural resources and restore natural processes, and to return a site to natural conditions.

revegetation: Replacement or augmentation of native plants in an area largely or entirely denuded of vegetation.

riparian areas: Areas that are on or adjacent to rivers and streams; these areas are typically rich in biological diversity.

rivulets: A small brook or stream; a streamlet.

S

Section 7 Consultation: Section 7 of the Endangered Species Act requires consultation with the U.S. Fish and Wildlife Service if the habitat of a threatened or endangered plant or animal may be affected by a federally authorized action.

surface water: Water that naturally flows or settles on top of natural landforms and vegetation, often as rivers, springs, seeps streams, lakes, ponds, and other bodies of water.

T

threatened species: Any species which is likely to become an endangered species within the foreseeable future throughout all or a significant portion of its range. These species are listed by the U.S. Fish and Wildlife Service.

V

visitor experience: The perceptions, feelings, and interaction a park visitor has in relationship with the environment.

W

watershed: The region draining into a river, river system, or body of water.

wetland: Areas that are inundated by surface or groundwater with a frequency sufficient to support, under normal circumstances, vegetation or aquatic life that requires saturated or seasonally saturated soil conditions for growth and reproduction.

LIST OF AGENCIES, ORGANIZATIONS, & INDIVIDUALS TO WHOM COPIES OF THE DRAFT PLAN WERE SENT

Federal Agencies

Department of the Army
- Army Corp of Engineers, Asheville Field Office, NC

Department of Interior
- Fish and Wildlife Service, Endangered Species Division, PA
- Fish and Wildlife Service, Endangered Species Division, VA
- Fish and Wildlife Service, Endangered Species Division, MD
- Fish and Wildlife Service, Asheville Field Office, NC

State Agencies

Department of Historic Resources
- NC Division of Cultural Resources, Raleigh
- NC Division of Archives & History, Asheville
- VA Department of Historic Resources, Richmond

Department of Environment, Health & Natural Resources
- NC DENR, Western Region

Department of Natural Resources
- NC Natural Heritage Program, Raleigh
- NC Wildlife Resources Commission, State Road

Department of State Clearinghouse
- NC Environmental Review, Raleigh

NC Museum of Natural Sciences, Living Collections, Raleigh
VA Department of Agriculture & Consumer Services, Abingdon
VA Department of Game & Inlands Fisheries, Blacksburg
VA Department of Conservation & Recreation, Richmond

Universities/Cooperating Professionals

University of North Carolina, Department of Environmental Studies, Asheville
Western Carolina University, Department of Biology, Cullowhee
State University of NY, College of Environmental Science & Forestry, Syracuse
Virginia Tech, Department of Fisheries & Wildlife Services, Blacksburg
Three Lakes Nature Center & Aquarium, Richmond
Western North Carolina Alliance, Asheville